

---

# SCIENCE EDUCATION

*Formerly* GENERAL SCIENCE QUARTERLY

THE OFFICIAL JOURNAL OF

*The National Association for Research in Science Teaching  
The National Council for Elementary Science, and  
Association for the Education of  
Teachers in Science*

Copyright, 1958, by SCIENCE EDUCATION, INCORPORATED

---

EDITOR

CLARENCE M. PRUITT

*University of Tampa*

*Tampa, Florida*

---

VOLUME 42—NUMBERS 1 TO 5

FEBRUARY—DECEMBER, 1958

SCIENCE EDUCATION, INCORPORATED  
525 West 120 Street  
New York City

Published  
February, March, October, and December  
1958

BOYD PRINTING CO., INC.

ALBANY, N. Y.



N  
D  
E  
K

MI

App  
C  
App  
ti  
C  
Ass  
S  
Ato  
S  
Jo  
Ben  
Bill  
G  
Bio  
P  
Cell  
S  
M  
Che  
lo  
4  
Col  
a  
P  
Con  
in  
Con  
in  
Con  
in  
Con  
E  
Con  
G  
N  
Con  
3  
Crit  
er  
S  
B  
W  
Cur  
S  
Den  
er  
a  
Dev  
th  
W  
Diff  
er  
In  
P  
Edu  
S  
Edw  
4  
Eff  
at  
Jo

# INDEX TO VOLUME 42

## ARTICLES

- Applied Science for General Education, A New Course in, Glenn F. Powers, 253-255.
- Appraisal of Elementary School Science Instruction in the State of Illinois, An, Helen J. Challand, 363-365.
- Association for the Education of Teachers in Science, 290-291.
- Atomic Structure Be Best Presented to a High School Class, How Can Modern Theories of, Joseph H. Shoemaker, 138-141.
- Benjamin C. Gruenberg, Clarence M. Pruitt, 6.
- Bill of Rights for Outdoor Education, William Gould Vinal, 187-204.
- Biology Interests of Tenth and Eleventh Grade Pupils, Sam S. Blanc, 151-159.
- Cell Principle: An Example of the Growth of Scientific Knowledge, Origin of the, Auley M. McAuley, 60-65.
- Chemical Terminology, Some Interesting Etymological Derivations of, Howard Nechamkin, 463-474.
- College Courses in Elementary-School Science and Their Relation to Teaching Problems, Peter C. Gega, 338-341.
- Comments on "Elementary Science for a Changing World," Arnold M. Lahti, 319-323.
- Comments on "Elementary Science for a Changing World," John D. McLain, 317-319.
- Comments on "Elementary Science for a Changing World," E. Bernice Owens, 323-326.
- Conceptogrammatic Materials in the Teaching of Elementary Science, Alfred A. Silano, 436-439.
- Concepts of Light and Sound in the Intermediate Grades, The Acquisition of, Pearl Astrid Nelson, 357-361.
- Conservation Center, Plan a, Raymond G. Kenyon, 336-338.
- Criteria for Selecting Supplementary Reading Science Books for Intellectually Gifted High School Students, Cyrus W. Barnes, Alfred D. Beck, William B. Reiner, and Nathan S. Washton, 215-218.
- Curricular Studies in Science Teaching, Types of, Sam S. Blanc, 159-162.
- Demonstration of Major Concept in General Science, George C. Wood, 383-384.
- Development and Status of Teacher Education in the Field of Science for the Elementary School, William D. Chamberlain, 406-409.
- Difficulties Encountered in the Teaching of Science in the Elementary Schools in Florida, An Investigation of Teacher-Recognized, Albert Piltz, 440-443.
- Education of Science Teachers for Today's Schools, Thoughts on, Laura Zirbes, 280-288.
- Edward Embree Wildman, Clarence M. Pruitt, 474.
- Effects of Experimentation in Teaching Science at the Eighth Grade Level, Describing the, Joseph Kiszka, 327-328.
- Elementary Teachers and Conservation Teaching, Robert C. Sherman, 347-349.
- Elementary Science and Listening, The Teacher of, Sam Duker, 341-344.
- Elementary Science for a Changing World, John Gabriel Navarra, 313-317.
- Exceptional High School Seniors in Science and Other Academic Areas, A Study of the Variability of, Kenneth E. Anderson, Tate C. Page, and Herbert A. Smith, 42-59.
- Experience in Physical Science for General Education, Direct, H. Clark Hubler, 431-436.
- Experimental Study of Laboratory Teaching Methods in General Zoology, An, Herbert Frings and Joseph H. Hichar, 255-262.
- Field Experiences in Teaching, In Support of, H. Seymour Fowler, 208-214.
- Field Study in the Public Schools, An Early Movement to Promote, Ralph W. Dexter, 344-346.
- Financial Report of NARST, Clarence M. Pruitt, 11.
- Florence Grace Billig, Clarence M. Pruitt, 275-279.
- Frank Covert Jean, Clarence M. Pruitt, 99-102.
- From the Acorn Grew an Oak, Irene G. Oppenheim, 425-426.
- General Education in Science Teaching, A Study of, Gerald C. Reed, 243-252.
- George Clayton Wood, Clarence M. Pruitt, 379-382.
- Grade-Placement Research, Problems of One Type of, John G. Read, 349-357.
- In-Service Education Program in Elementary School Science, The Development and Evaluation of, Ward L. Sims, 391-398.
- International Scientific Developments Affect Science in the Elementary School, How, June E. Lewis, 366-367.
- Invention in Society, The Role of, Bruce Stewart, 73-78.
- Joe Zaffaroni, Clarence M. Pruitt, 304.
- Knowledges of Physical Science with Those of Biological Science of College Students, A Comparison of the, George Greisen Mallinson and Conway C. Sams, 20-23.
- Laboratory Renovation, Planning for, Benjamin J. Novak, 422-425.
- Learning Process in Science Teaching, A Consideration of the, Stanley B. Brown, 79-86.
- Majors and Minors by Prospective Secondary School Teachers, Selection of, Leonard A. Ford, 181-183.
- Minutes for the National Council for Elementary Science, Mervin L. Johnson, 306-307.
- Moral Armor for the Atomic Age, David B. Steinman, 175-179.
- Mrs. Lucy Langdon Williams Wilson, William Gould Vinal, 456-459.
- Nathan S. Washton, Clarence M. Pruitt, 3-5.
- Official Minutes of the Thirtieth Annual Meeting of the National Association for Research in Science Teaching, Clarence M. Pruitt, 9-11.

- Outdoor Education, Bill of Rights for, William Gould Vinal, 187-204.
- Outdoor Science Experiences of College Freshmen in Oregon, A Survey of, Irene Hollenbeck, 219-224.
- "Out of the Mouths of Babes," Irving W. Knobloch, 426-428.
- Panel Notes, Bernice Lee, 308-311.
- Periodic Chart and Its Use as a Teaching Tool, History and Development of the, Joseph H. Shoemaker, 142-151.
- Physical Science for Elementary Education Majors, The Selection of Experiences in, Allen D. Weaver, 26-33.
- Planning a Preservice Program in Science Suitable for All Elementary Teachers, William Adams, Jr. and Lorin E. Bixler, 368-372.
- Problem Solving Behaviors in Elementary School Children, Developing, Bernard E. Michals, 334-336.
- Program National Council for Elementary Science, 305-306; 312-313.
- Program of Thirtieth Annual Meeting of the National Association for Research in Science Teaching, 7-9.
- Prospective Elementary School Teachers, Principles of Biology for, B. John Syrocki, 86-93.
- Psychology and Philosophy of Science Teaching, The, George Greisen Mallinson, 17-19.
- Reading Difficulty of Materials for Elementary Science, An Investigation of Two Methods of Measuring the, Roma Lenore Herrington and George Greisen Mallinson, 385-390.
- Recommendations Relative to Our Educational System, Dwight D. Eisenhower, 103-106.
- Report of the Fall 1957 Meeting of the Association for the Education of Teachers in Science, A, Tracy H. Ashley, 291-301.
- Report of Symposium I, Lawrence F. Hubbell, 365-366.
- Report to the NARST on the Relationships with the American Association for the Advancement of Science for the Year 1956-57, A, George Greisen Mallinson, 12-17.
- Robert K. Wichware, Clarence M. Pruitt, 289-290.
- Samuel Christian Schmucker, William Gould Vinal, 453-455.
- Science and Education, R. S. Hoehler, 179-181.
- Science and Mathematics Courses Elected by the 1956 Senior Class, and the Number of Seniors Who Planned to Specialize in Scientific Fields in the Academic High Schools in New York City, A Study of the, Samuel Schenberg, 225-238.
- Science at Your Finger Tips—Effects of Air in Motion, Alfred D. Beck, 428-430.
- Science Experiences in the Elementary School, Evalyn Duff, 374-376.
- Science for Six-Year Olds, Mildred Ballow, 301-303.
- Science Interests and Their Use in Curriculum Construction, The Estimation of, William Leader, 444-453.
- Science Interests of Junior High School Students, W. Grant Glenn, 263-264.
- Science Interest Studies, Critical Review of, Sam S. Blanc, 162-168.
- Science in the News, Gertrude B. Hoffsten, 412-413.
- Science, Philosophy, "Common Sense"—and the American High School, Harold H. Punke, 409-412.
- Science Plus Social Studies Equals Understanding, R. R. Buell, 398-400.
- Scientific Attitudes Possessed by Junior High School Students, George A. Lednew and Gene W. Moser, 326-327.
- Scientific Method, How to Teach the, James J. Thompson, 264-271.
- Society and Science, The Interactions of, William B. Reiner, 37-42.
- Soil "Conditioner" Experiments for a Geography or Science Class, Thomas Frank Barton, 372-374.
- Sound Motion Pictures in High School Biology, An Inquiry Into Some Possible Learning Differentials as a Result of the Use of, Herbert A. Smith and Kenneth E. Anderson, 34-37.
- Student Drawings vs. Photomicrographs, Lawrence J. Kieley, 66-73.
- Study of Formulating and Suggesting Tests for Hypotheses in Elementary School Science Learning Experiences, A, J. Myron Atkin, 414-422.
- Survival Dependent on Improved Science Education, Is, Robert D. MacCurdy, 23-26.
- Textbook Analysis in Determining Course Content for Physical Science General Education Courses, The Use of, Robert T. Blackburn, 459-463.
- Trends in Curriculum and in Instruction in the Physical Sciences of the Secondary Schools, Roy C. Rice, 238-243.
- Trends in Science Education, Sam S. Blanc, John W. Low, and George W. Mathes, 168-175.
- William Lewis Eikenberry, Clarence M. Pruitt, 7.
- William Gould Vinal, Clarence M. Pruitt, 204-208.
- Wisconsin High School Teachers of Physics, Chemistry, Biology, and General Science, The Nature of the Academic Preparation in Science of, Milton O. Pella, 106-137.
- Workshops in Teaching Elementary Science: An In-Service Training Program for Teachers, A, Clyde M. Brown, 401-405.

## AUTHORS

- ADAMS, JR., WILLIAM AND LORIN E. BIXLER, Planning a Preservice Program in Science Suitable for All Elementary Teachers, 368-372.
- ANDERSON, KENNETH E., TATE C. PAGE, AND HERBERT A. SMITH, A Study of the Variability of Exceptional High School Seniors in Science and Other Academic Areas, 42-59.
- AND HERBERT A. SMITH, An Inquiry into Some Possible Learning Differentials as a Result of the Use of Sound Motion Pictures in High School Biology, 34-37.
- ASHLEY, TRACY H., A Report of the Fall 1957 Meeting of the Association for the Education of Teachers in Science, 291-301.
- ATKIN, J. MYRON, A Study of Formulating and Suggesting Tests for Hypotheses in Elementary School Science Learning Experiences, 414-422.

- BALLOU, MILDRED, Science for Six-Year-Olds, 301-303.
- BARNES, CYRUS W., ALFRED D. BECK, WILLIAM B. REINER, AND NATHAN S. WASHTON, Criteria for Selecting Supplementary Reading Science Books for Intellectually Gifted High School Students, 215-218.
- BARTON, THOMAS FRANK, Soil "Conditioner" Experiments for a Geography or Science Class, 372-374.
- BECK, ALFRED D., CYRUS W. BARNES, WILLIAM B. REINER, AND NATHAN S. WASHTON, Criteria for Selecting Supplementary Reading Science Books for Intellectually Gifted High School Students, 215-218.
- , Science at your Fingertips—Effects of Air in Motion, 428-430.
- BIXLER, LORIN E. AND WILLIAM ADAMS, JR., Planning a Preservice Program in Science Suitable for All Elementary Teachers, 368-372.
- BLACKBURN, ROBERT T., The Use of Textbook Analysis in Determining Course Content for Physical Science General Education Courses, 459-463.
- BLANC, SAM S., Biology Interests of Tenth and Eleventh Grade Pupils, 151-159.
- , Critical Review of Science Interest Studies, 162-168.
- , Type of Curricular Studies in Science Teaching, 159-162.
- , JOHN W. LOW, AND GEORGE E. MATHES, Trends in Science Education, 168-175.
- BROWN, CLYDE M., A Workshop in Teaching Elementary Science: An In-Service Training Program for Teachers, 401-405.
- BROWN, STANLEY B., A Consideration of the Learning Process in Science Teaching, 79-86.
- BUELL, R. R., Science Plus Social Studies Equals Understanding, 398-400.
- CHALLAND, HELEN J., An Appraisal of Elementary School Science Instruction in the State of Illinois, 363-365.
- CHAMBERLAIN, WILLIAM D., Development and Status of Teacher Education in the Field of Science for the Elementary School, 406-409.
- DEXTER, RALPH W., An Early Movement to Promote Field Study in the Public Schools, 344-346.
- DUFF, EVALYN, Science Experiences in the Elementary School, 374-376.
- DUKER, SAM, The Teacher of Elementary Science and Listening, 341-344.
- EISENHOWER, DWIGHT D., Recommendations Relative to Our Educational System, 103-106.
- FORD, LEONARD A., Selection of Majors and Minors by Prospective Secondary School Teachers, 181-183.
- FOWLER, H. SEYMOUR, In Support of More Field Experiences in Teaching, 208-214.
- FRINGS, HUBERT AND JOSEPH H. HICHAR, An Experimental Study of Laboratory Teaching Methods in General Zoology, 255-262.
- GEGA, PETER C., College Courses in Elementary-School Science and Their Relation to Teaching Problems, 338-341.
- GLENN, W. GRANT, Science Interests of Junior High School Students, 263-264.
- HERRINGTON, ROMA LENORE AND GEORGE GRIESEN, An Investigation of Two Methods of Measuring the Reading Difficulty of Materials for Elementary Science, 385-390.
- HICHAR, JOSEPH H. AND HUBERT FRINGS, An Experimental Study of Laboratory Teaching Methods in General Zoology, 255-262.
- HOEHLER, R. S., Science and Education, 179-181.
- HOFFSTEN, GERTRUDE B., Science in the News, 412-413.
- HOLLENBECK, IRENE, A Survey of Outdoor Science Experiences of College Freshmen in Oregon, 219-224.
- HUBBELL, LAWRENCE, Report of Symposium I, 365-366.
- HUBLER, H. CLARK, Direct Experience in Physical Science for General Education, 431-436.
- JOHNSON, MERVIN L., Minutes for the National Council for Elementary Science, 306-307.
- KENYON, RAYMOND G., Plan a Conservation Center, 336-338.
- KIELEY, LAWRENCE J., Student Drawings vs. Photomicrographs, 66-73.
- KISZKA, JOSEPH, Describing the Effects of Experimentation in Teaching Science at the Eighth-Grade Level, 327-333.
- KNOBLOCH, IRVING W., "Out of the Mouths of Babes," 426-428.
- LAHTI, ARNOLD M., Comments on "Elementary Science for a Changing World," 319-323.
- LEADER, WILLIAM, The Estimation of Science Interests and Their Use in Curriculum Construction, 444-453.
- LEDNEW, GEORGE A. AND GENE W. MOSER, Scientific Attitudes Possessed by Junior High School Students, 326-327.
- LEE, BERNICE, Panel Notes, 308-311.
- LEWIS, JUNE, How Recent International Scientific Developments Affect Science in the Elementary School, 366-367.
- LOW, JOHN W., SAM S. BLANK, AND GEORGE E. MATHES, Trends in Science Education, 168-175.
- MACCURDY, ROBERT D., Is Survival Dependent on Improved Science Education, 23-26.
- MACAULEY AULEY A., Origin of the Cell Principle: An Example of the Growth of Scientific Knowledge, 60-65.
- McLAIN, JOHN D., Comments on "Elementary Science for a Changing World," 317-319.
- MALLINSON, GEORGE GREISEN, A Report to the NARST on the Relationship with the American Association for the Advancement of Science for the Year 1956-57, 12-17.
- , The Psychology and Philosophy of Science Teaching, 17-19.
- AND CONWAY C. SAMS, A Comparison of the Knowledges of Physical Sciences with Those of Biological Science of College Students, 20-23.
- AND ROMA LENORE HERRINGTON, An Investigation of Two Methods of Measuring the Reading Difficulty of Materials for Elementary Science, 385-390.
- MATHES, GEORGE E., SAM S. BLANC, AND JOHN W. LOW, Trends in Science Education, 168-175.
- MICHALS, BERNARD E., Developing Problem Solving Behaviors in Elementary School Children, 334-336.



- MOSER, GENE W. AND GEORGE A. LEDNEW, Scientific Attitudes Possessed by Junior High School Students, 326-327.
- NAVARRA, JOHN GABRIEL, Elementary Science for a Changing World, 313-317.
- NECHAMKIN, HOWARD, Some Interesting Etymological Derivations of Chemical Terminology, 463-474.
- NELSON, PEARL ASTRID, The Acquisition of Concepts of Light and Sound in the Intermediate Grades, 357-361.
- NOVAK, BENJAMIN J., Planning for Laboratory Renovation, 422-425.
- OPPENHEIM, IRENE G., From the Acorn Grew an Oak, 425-426.
- OWENS, E. BERNICE, Comments on "Elementary Science for a Changing World," 323-326.
- PADEN, JOHN M. AND GLENN F. POWERS, A New Course in Applied Science for General Education, 253-255.
- PAGE, TATE C., KENNETH E. ANDERSON, AND HERBERT A. SMITH, A Study of the Variability of Exceptional High School Seniors in Science and Other Academic Areas, 42-59.
- PELLA, MILTON O., The Nature of the Academic Preparation in Science of Wisconsin High School Teachers of Physics, Chemistry, Biology, and General Science, 106-137.
- PILTZ, ALBERT, An Investigation of Teacher—Recognized Difficulties Encountered in the Teaching of Science in the Elementary Schools in Florida, 440-443.
- POWERS, GLENN F. AND JOHN M. PADEN, A New Course in Applied Science for General Education, 253-255.
- PRUITT, CLARENCE M., Benjamin C. Gruenberg, 6.
- , Edward Embree Wildman, 474.
- , Financial Report of NARST, 3.
- , Florence Grace Billig, 275-279.
- , Frank Covert Jean, 99-102.
- , George Clayton Wood, 379-382.
- , Joe Zaffaroni, 304.
- , Nathan S. Washton, 3-5.
- , Official Minutes of the Thirtieth Annual Meeting of the National Association for Research in Science Teaching, 9-11.
- , Robert K. Wickware, 289-290.
- , William Gould Vinal, 204-208.
- , William Lewis Eikenberry, 7.
- PUNKE, HAROLD H., Science, Philosophy, "Common Sense"—and the American High School, 409-412.
- READ, JOHN, G., Present Status and Problems of One Type of Grade-Placement Research, 349-357.
- REED, GERALD C., A Study of General Education in Science Teaching, 243-252.
- REINER, WILLIAM B., The Interactions of Society and Science, 37-42.
- , CYRUS W. BARNES, ALFRED D. BECK, AND NATHAN S. WASHTON, Criteria for Selecting Supplementary Reading Science Books for Intellectually Gifted High School Students, 215-218.
- RICE, ROY C., Trends in Curriculum and in Instruction in the Physical Sciences of the Secondary Schools, 238-243.
- SAMS, CONWAY C. AND GEORGE GREISEN MALLINSON, A Comparison of the Knowledges of Physical Science with Those of Biological Science of College Students, 20-23.
- SCHENBERG, SAMUEL, A Study of the Science and Mathematics Courses Elected by the 1956 Senior Class, and the Number of Seniors Who Planned to Specialize in Scientific Fields in the Academic High Schools of New York City, 225-238.
- SHERMAN, ROBERT C., Elementary Teachers and Conservation Teaching, 347-349.
- SHOEMAKER, JOSEPH H., History of the Development of the Periodic Chart and Its Use as a Teaching Tool, 142-151.
- , How Can Modern Theories of Atomic Structure Be Best Presented to a High School Class?, 138-141.
- SILANO, ALFRED A., Conceptogrammatic Materials in the Teaching Elementary Science, 436-439.
- SIMS, WARD L., The Development and Evaluation of an In-Service Education Program in Elementary School Science, 391-398.
- SMITH, HERBERT A. AND KENNETH E. ANDERSON, An Inquiry Into Some Possible Learning Differentials as a Result of the Use of Sound Motion Pictures in High School Biology, 34-37.
- , KENNETH E. ANDERSON, AND TATE C. PAGE, A Study of the Variability of Exceptional High School Seniors in Science and Other Academic Areas, 42-59.
- STEINMAN, DAVID B., Moral Armor for the Atomic Age, 175-179.
- STERNIG, JOHN, Nuts to Space Travel, 361-363.
- STEWART, BRUCE, The Role of Invention in Society, 73-78.
- SYROCKI, B. JOHN, Principles of General Biology for Prospective Elementary School Teachers, 86-93.
- THOMPSON, JAMES J., How to Teach the Scientific Method, 264-271.
- VINAL, WILLIAM GOULD, Bill of Rights for Outdoor Education, 187-204.
- , Mrs. Lucy Langdon Williams Wilson, 456-459.
- , Samuel Christian Schmucker, 453-455.
- WASHTON, NATHAN S., CYRUS W. BARNES, ALFRED D. BECK, AND WILLIAM B. REINER, Criteria for Selecting Supplementary Reading Science Books for Intellectually Gifted High School Students, 215-218.
- WEAVER, ALLEN D., The Selection of Experiences in Physical Science for Elementary Education Majors, 26-33.
- WOOD, GEORGE C., Demonstration of a Major Concept in General Science, 383-384.
- ZIRBES, LAURA, Thoughts on the Education of Science Teachers for Today's School, 280-288.

#### BOOK REVIEWS

94-97; 183-184; 271-272.



